

Digital Pixel Readout Integrated Circuit for High Dynamic Range Infrared Imaging Applications, Phase I

Completed Technology Project (2018 - 2019)



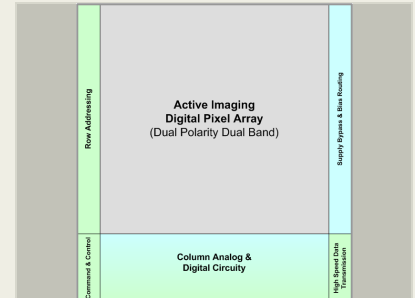
Project Introduction

This proposal outlines a digital pixel readout integrated circuit (DPROIC) to achieve extremely high dynamic range, high speed and elegant functionality for infrared image focal plane arrays. This digital pixel readout will be a complete camera-on-chip architecture when combined with single or dual polarity dual band detectors in a hybrid fashion. It will have a wide operating temperature range to support a broad range of detector architectures. The proposed DPROIC will be implemented in a mature CMOS process with much more reasonable mask costs as compared to that of state-of-the-art line width processes, saving money and broadening the possible supplier base. The final product will be flexible enough to be used as a generic readout integrated circuit for a broad range of NASA missions and other applications.

Anticipated Benefits

Earth observing including water vapor, sea ice, land and water temperature, ecosystem dynamics, weather science, land resource mapping; Solar System and astronomy applications such as imaging cold bodies near bright objects, measuring temperatures and atmospheres of planets; Any application requiring two color (any combination of and from shortwave to longwave) detectors to determine precise irradiances at two different wavelengths radiating from the same area at the same time.

Ground combat and air combat applications of all types using a wide variety of detector materials and cutoff wavelengths; Military surveillance compatible with sun-approach warnings; Missile seekers; Homeland security applications; Biometrics; Fire/disaster emergencies (observation and analysis); Security and surveillance in hostile scene situations; Industrial (robotics, weld verification, high temperature processing, heat gradient verification); Medical applications.



Digital Pixel Readout Integrated Circuit for High Dynamic Range Infrared Imaging Applications, Phase I

Table of Contents

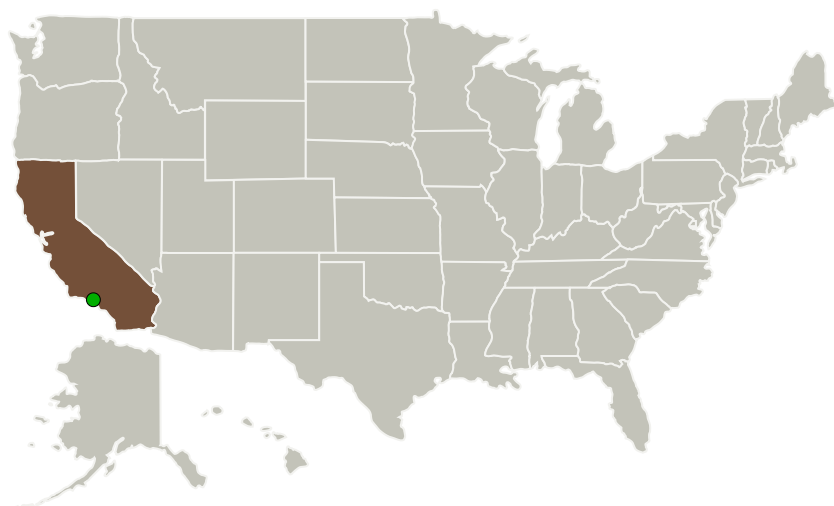
Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destinations	3

Digital Pixel Readout Integrated Circuit for High Dynamic Range Infrared Imaging Applications, Phase I

Completed Technology Project (2018 - 2019)



Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Senseker Engineering, Inc.	Lead Organization	Industry	Santa Barbara, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Project Transitions

July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/141014>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Senseker Engineering, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

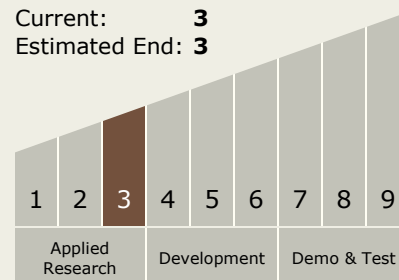
Carlos Torrez

Principal Investigator:

Kenton Veeder

Technology Maturity (TRL)

Start: **3**
Current: **3**
Estimated End: **3**

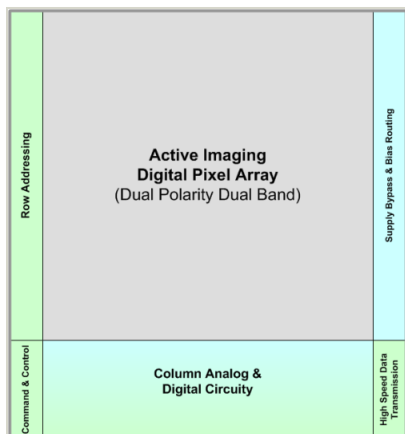


Digital Pixel Readout Integrated Circuit for High Dynamic Range Infrared Imaging Applications, Phase I

Completed Technology Project (2018 - 2019)



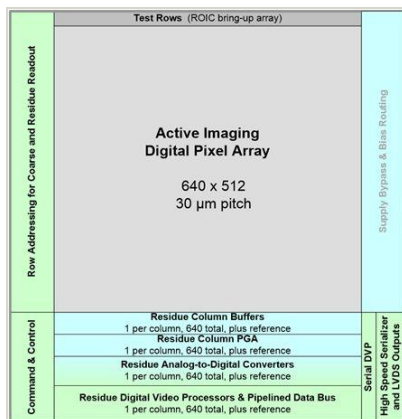
Images



Briefing Chart Image

Digital Pixel Readout Integrated Circuit for High Dynamic Range Infrared Imaging Applications, Phase I

(<https://techport.nasa.gov/image/133267>)



Final Summary Chart Image

Digital Pixel Readout Integrated Circuit for High Dynamic Range Infrared Imaging Applications, Phase I

(<https://techport.nasa.gov/image/126962>)

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

Outside the Solar System, Earth